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EXAMINER	
ABDI, AMARA	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/789,674	WORTHINGTON ET AL.	
	Examiner	Art Unit	
	Amara Abdi	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 February 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-38* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *02/03/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 6-9,14-15,25-28, and 33-34 is objected to because of the following informalities:

(1) Claim 6, line 7, "**a** filter kernel" should be changed to "**the** filter kernel"; and the same informality was found in **claim 25**, line 4;

(2) Claim 9, line 16, "**a** filtered value" should be changed to "**the** filtered value", and the same informality was found in **claim 28**, line 15;

(3) Claim 14, line 8, "**a** substantially" should be changed to "**the** substantially", and the same informality was found in **claim 15**, line 16; **claim 33**, line 6; and **claim 34**, line 14.

Appropriate correction is required.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. The claimed invention is directed to non-statutory subject matter. Claims 20-28 are rejected. "A software product" must be "computer readable medium encoded with software" to be a statutory subject matter.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-3,9,13-15,18,20-22,28,32-34, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gallagher (US 6,728,416) in view of Maurer (US-PGPUB 2005/0025378).

(1) Regarding claims 1 and 20:

Gallagher disclose a method for filtering an image (column 4, line 21-22) including a plurality of pixels (column 4, line 20-21), comprising:

defining a difference kernel (column 15, line 28-29) based on local difference between a first kernel and a second kernel (column 15, line 30), (the first and the second kernel are read as b0, and a1), the first and second kernel being defined by the filter kernel centered at a first location and second location (column 15, line 30), respectively, the second location being separated from the first location by the characteristic distance separating adjacent pixels in the sequence (it is read that the distance separating adjacent pixels in the sequence is inherent), the difference kernel specifying difference weights for pixels in a neighborhood surrounding a center of the difference kernel (column 15, line 13-15); and

using the difference kernel to determine a difference between a filtered value of a current pixel and a filtered value of a previous pixel that is adjacent to the current pixel in the sequence (column 15, line 28-29).

Gallagher does not explicitly mention the software product, and receiving of a filter kernel to determine one or more filtered values for each pixel in a sequence of pixels in the image.

Maurer, in analogous environment, teaches a method for bilateral filtering of digital images, where employing an algorithm (paragraph [0014], line 2-3), (the algorithm is read as the software product), and using the filter kernel to determine a filtered value for each pixels in the image (paragraph [0006], line 3-6; and paragraph [0037],[0038], line 1-9).

It would have been obvious to one having ordinary skills in art at the time the invention was made to use the method of Maurer, where the filter kernel is determined, in the method of Gallagher in order to preserve the detail without reference to a specific detail size rage (in contrast the most single linear filter approaches) and artifacts are prevented (column 4, line 31-33).

(2) Regarding claim 2:

Gallagher further disclose the determining of the filtered value of the current pixel based on the filtered value of the previous pixel (column 15, line 40-43), (the current and previous pixels are read as pixels at $(I, j)^{th}$ position) and the difference between the filtered value of the current pixel and the previous pixel (column 15, line 28-29).

(3) Regarding claim 3:

Gallagher further disclose the filter kernel specifying filtering weights for pixels in a region within the neighborhood surrounding the center of the filter kernel (column 15, line 13-15).

(4) Regarding claim 9:

Gallagher disclose all the subject matter as described in claim 1 above.

Gallagher does not explicitly mention the using of the filter kernel directly to determine a filter value of the first pixel I the sequence of pixels.

Maurer, in analogous environment, teaches a method for bilateral filtering of digital images, where using the filter kernel to determine a filtered value for each pixels in the image (the determining of the filtered value is interpreted including the first pixel), (paragraph [0006], line 3-6; and paragraph [0037],[0038], line 1-9).

It would have been obvious to one having ordinary skills in art at the time the invention was made to use the method of Maurer, where the filter kernel is used to determine the filtered value of pixels, in the method of Gallagher in order to preserve the detail without reference to a specific detail size rage (in contrast the most single linear filter approaches) and artifacts are prevented (column 4, line 31-33).

(5) Regarding claim 13:

Gallagher further disclose the defining of the difference kernel based on local difference between the first and the second kernel (column 15, line 30) includes:

identifying difference pixels in the neighborhood surrounding the center of the difference kernel (column 15, line 30), for each difference pixel, the first kernel and the second kernel specifying substantially different filtering weights (column 15, line 13-15); and

defining a substantially non-zero difference weight for each difference pixel (column 8, line 42-53), (the defining of the non-zero difference weight is read as the same concept as the defining of filtering weights for pixels).

(6) Regarding claim 14:

Gallagher further disclose the defining of the non-zero difference weights (column 8, line 42-53) includes the defining a difference weight that is proportional to the difference between the filtering weights specified for the pixel by the first and second kernels (column 15, line 28-29).

(7) Regarding claim 15:

Gallagher further disclose the identifying of difference pixels includes generating a list of relative positions of the identified pixels in the neighborhood surrounding the center of the difference kernel (column 15, line 30); and

Using the difference kernel to determine the difference between the filtered values of the current pixel and previous pixel (column 15, line 28-29) includes using the list of relative positions to identify current difference pixels (column 15, line 30) that have the substantially non-zero difference weight when the difference kernel is centered at the current pixel (column 8, line 42-53), (the defining of the non-zero difference weight is read as the same concept as the defining of filtering weights for pixels).

(8) Regarding claim 18:

Gallagher disclose all the subject matter as described in claim 1 above. (the examiner interpreted the receiving of the defining of next difference kernel as the same concept as the defining of the difference kernel).

Gallagher does not explicitly mention the receiving of a next filter kernel to determine one or more filtered values for each pixel in a sequence of pixels in the image.

Maurer, in analogous environment, teaches a method for bilateral filtering of digital images, where using the filter kernel to determine a filtered value for each pixels in the image (paragraph [0006], line 3-6; and paragraph [0037],[0038], line 1-9), (the examiner interpreted the next filter kernel as the same concept as the filter kernel).

It would have been obvious to one having ordinary skills in art at the time the invention was made to use the method of Maurer, where the next filter kernel is determined, in the method of Gallagher in order to preserve the detail without reference to a specific detail size rage (in contrast the most single linear filter approaches) and artifacts are prevented (column 4, line 31-33).

(9) Regarding claim 21-22,28,32-34, and 37:

Gallagher disclose all the subject matter as described in claims 2-3,9,13-15, and 18 above.

Gallagher do not explicitly mention the software product.

Maurer, in analogous environment, teaches a method for bilateral filtering of digital images, where employing the algorithm (paragraph [0014], line 2-3), (the algorithm is read as the software product).

It would have been obvious to one having ordinary skills in art at the time the invention was made to use the method of Maurer, where using the software product, in the method of Gallagher in order to execute the method of filtering the image (paragraph [0014, line 8-9).

6. Claims 4 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gallagher and Maurer, as apples to claim 1, and further in view of Chang et al. (US 5,615,243).

Gallagher and Maurer disclose all the subject matter as described in claims 1 and 20 above.

Furthermore, Gallagher disclose the filter kernel specifying the non-zero filtering weights for pixels (column 8, line 42-53).

Gallagher and Maurer do not explicitly mention the regions having convex or concave shapes surrounding the center of the filter kernel.

Chang et al., in analogous environment, teaches an identification of suspicious mass regions in mammograms, where regions surrounding the center of the filter kernel have convex or concave shapes (column 3, line 13-14; and column 4, line 3-5).

It would have been obvious to one having ordinary skills in art at the time the invention was made to use the method of chang et al., where using regions

having concave or convex shape, in the method of Gallagher in order to achieve the sensitivity required for clinical utility (column 1, line 31-32).

7. Claims 5 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gallagher, Maurer and Chang et al. as applied to claim 4, and further in view of Summers et al. (US 6,556,696).

Gallagher Maurer and Chang disclose all the subject matter as described in claims 4 and 23 above.

Gallagher, Maurer and Chang et al do not explicitly mention the circular or elliptical region surrounding the center of the filter kernel.

Summers et al., in analogous environment, teaches a method for segmenting medical images, where regions of elliptical curvature with positive mean curvature above threshold are retained (column 18, line 22-25).

It would have been obvious to one having ordinary skills in art at the time the invention was made to use the method of Summers et al., where the regions of circular or elliptical shape are used, in the method of Gallagher in order to accurately characterize the shape of polypoid lesions found in the bronchus and can be adapted for other anatomical structure as well (column 5, line 11-14).

8. Claims 6-8,10,25-27, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gallagher and Maurer, as applied to claim 1, and further in view of Baumberg (US 6,791,540).

(1) Regarding claims 6 and 25:

Gallagher and Maurer disclose all the subject matter as described in claims 1 and 20 above.

Gallagher and Maurer do not explicitly mention the specifying of the same value for local attribute of the image.

Baumberg, in analogous environment, teaches an image processing apparatus, where specifying the same value for the local attribute (column 10, line 24-29), (the local attribute is read as the depth map image)

It would have been obvious to one having ordinary skills in art at the time the invention was made to use the method of Baumberg, where the local attribute of the image is the same, in the method of Gallagher in order to view the scene in different viewing position/orientation such as photographs, television pictures, and video pictures (column 1, line 8-13).

(2) Regarding claims 7 and 26:

Gallagher, Maurer, and Baumberg disclose all the subject matter as described in claims 6 and 25 above.

Gallagher, Maurer, and Baumberg do not explicitly mention that the local attribute is a depth value corresponding to a distance of objects relative to focal distance.

Baumberg, in analogous environment, teaches an image processing apparatus, where the local attribute is a depth value (column 10, line 15-16) corresponding to a distance of object relative to focal distance (column 10, line 24-25).

It would have been obvious to one having ordinary skills in art at the time the invention was made to use the method of Baumberg, where the local attribute is corresponding to the depth value, in the method of Gallagher in order to view the scene in different viewing position/orientation such as photographs, television pictures, and video pictures (column 1, line 8-13).

(3) Regarding claims 8 and 27:

Gallagher further disclose the method, where the local attribute is a luminance of pixels in the sequence (column 5, line 36-39).

(4) Regarding claims 10 and 29:

Gallagher and Maurer disclose all the subject matter as described in claims 1 and 20 above.

Gallagher and Maurer do not explicitly mention that characteristic distance is defined by the neighboring pixels in the image.

Baumberg, in analogous environment, teaches an image processing apparatus, where the characteristic distance is calculated between the center of each depth image (column 8, line 22-25), (the examiner interpreted that the pixels are neighbors since the distance is calculated between the centers of the depth image).

It would have been obvious to one having ordinary skills in art at the time the invention was made to use the method of Baumberg, where the distance is defined by the neighboring pixels, in the method of Gallagher in order to be able to view the scene in different viewing position/orientation such as photographs, television pictures, and video pictures (column 1, line 8-13).

9. Claims 11 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gallagher and Maurer, as applied to claim 1, and further in view of Ishiwata (US 5,541,658).

Gallagher and Maurer disclose all the subject matter as described in claims 1 and 20 above.

Gallagher and Maurer do not explicitly mention that the pixels are arranged in a single direction in the image.

Ishiwata, in analogous environment, teaches an image coding-decoding apparatus, where the separated pixels data are arranged in a single row of a horizontal direction (column 3, line 44-45).

It would have been obvious to one having ordinary skills in art at the time the invention was made to use the method of Ishiwata, where the pixels are arranged in a single direction, in the method of Gallagher in order that the amount of effective data accessible in a time unit can be significantly increased in the course of processing data in the field unit (column 3, line 48-50).

10. Claims 12 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gallagher, Maurer, and Ishiwata, as applied to claim 11 above, and further in view of Fossum (US 6,704,049).

Gallagher, Maurer, and Ishiwata disclose all the subject matter as described in claims 11 and 30 above.

Gallagher, Maurer, and Ishiwata do not explicitly mention that pixels in the image are arranged in a rectangular array including pixels in row, a column or diagonal.

Fossum, in analogous environment, teaches an interpolator for CMOS image sensor using a digital register, where the photosensitive sites (and corresponding pixels cells) are arranged in a rectangular array of rows and columns (column 4, line 60-61).

It would have been obvious to one having ordinary skills in art at the time the invention was made to use the method of Fossum, where the image pixels are arranged in rectangular array, in the method of Gallagher in order for the imager to be used with many commonly used color filter patterns (column 4, line 8-9).

11. Claims 16 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gallagher and Maurer, as applied to claim 13 above, and further in view Silver (US 6,457,032).

Gallagher and Maurer disclose all the subject matter as described in claims 13 and 32 above.

Gallagher and Maurer do not explicitly mention the determining of local contribution and summing up the corresponding local contribution.

Silver, in analogous environment, teaches an efficient flexible digital filtering, where determining the local contribution based on the difference weight (column 7, line 7-13), (the local contribution is read as the zero weight of the local

contribution), and summing up the corresponding weights (column 6, line 5-10; and line 18-20)

It would have been obvious to one having ordinary skills in art at the time the invention was made to use the method of Silver, where summing the local contribution, in the method of Gallagher in order to benefit from higher performance digital filtering executed on inexpensive digital hardware as well as more flexibility in specifying the shape of digital filter kernel (column 3, line 30-33).

12. Claims 17 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gallagher, Maurer, and Silver, as applied to claim 16 above, and further in view of Baumberg (US 6,791,540).

Gallagher, Maurer, and Silver disclose the entire subject as described in claim 16 and 35 above. (The examiner interpreted that it is inherent when determining of the zero weight for the difference pixels that the depth value is different).

Gallagher, Maurer, and Silver do not explicitly mention that each pixel has the same depth value.

Baumberg, in analogous environment, teaches an image processing apparatus, where specifying the same depth value for each pixel (column 10, line 24-29).

It would have been obvious to one having ordinary skills in art at the time the invention was made to use the method of Baumberg, where using the same

depth value for each pixel, in the method of Gallagher in order to view the scene in different viewing position/orientation such as photographs, television pictures, and video pictures (column 1, line 8-13).

13. Claims 19 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gallagher in view of Tom (US 4,683,496), and Baumberg (US 6,791,540).

Gallagher disclose all the subject matter as described in claims 1 and 20 above.

Gallagher does not explicitly mention:

(1) the receiving of the blur filter kernel to determine one or more blurred values for each pixel, and using the blur kernel directly to determine a blurred value of first pixel; and

(2) each pixel having the same depth value, adjacent pixels being separated by the characteristic distance in the image.

(a) Concerning item (1):

Tom, in analogous environment, teaches a system and method for enhancing images, where a blur kernel is chosen to provide 5x5 convolution and can be generated (column 7, line 40-42), and using the blur kernel directly to determine a blurred value of first pixel (column 7, line 59-61).

It would have been obvious to one having ordinary skills in art at the time the invention was made to use the method of Tom, where using the blur filter kernel, in the method of Gallagher in order to provide a method of enhancing the

resolution of a first frequency band using information contained within other pictorial representation of the image within the second frequency band, where the second pictorial representation has a better resolution than the first pictorial representation (column 2, line 16-22).

(b) Concerning item (2):

Baumberg, in analogous environment, teaches an image processing apparatus, where specifying the same value for the depth map image (column 10, line 24-29).

It would have been obvious to one having ordinary skills in art at the time the invention was made to use the method of Baumberg, where the depth value is the same, in the method of Gallagher in order to view the scene in different viewing position/orientation such as photographs, television pictures, and video pictures (column 1, line 8-13).

Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Amara Abdi whose telephone number is (571) 270-1670. The examiner can normally be reached on Monday through Friday 7:30 Am to 5:00 PM E.T..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wu Jingge can be reached on (571) 272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Amara Abdi
06/21/2007.

JINGGE WU
SUPERVISORY PATENT EXAMINER